



**Directorate of
Intelligence**

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Science and Weapons Daily Review

**Wednesday
6 June 1984**

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*SW SWDR 84-109
6 June 1984*

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


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
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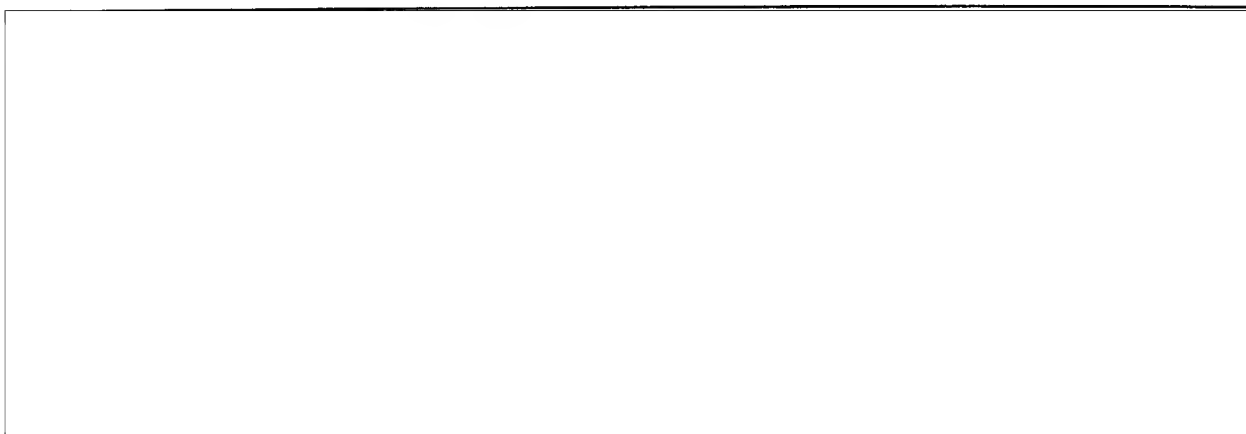
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USSR: THERMOMECHANICAL TREATMENT USED TO
IMPROVE STRENGTH OF WELDED STRUCTURES 

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A recently published article in a Soviet journal discusses the use of a specific thermomechanical treatment to significantly increase the strength of joints on welded structures; we believe the treatment will become a major Soviet technique for improving alloy properties. 

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USSR: THERMOMECHANICAL TREATMENT USED TO IMPROVE STRENGTH OF
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In a recently published article in a Soviet journal, B. Ye. Paton, Director of the Paton Electric Welding Institute, and others address problems with the joints of welded structures. The joints typically are lower in strength than the metal being welded. The authors stated that the strength of a welded aluminum structure was significantly increased by using a specific thermomechanical treatment (TMT).

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Comment:

We believe that TMT will become a major Soviet technique for improving metal alloy properties. TMT combines heat treatment and mechanical deformation to produce modifications in alloy microstructures. Physical properties of alloys such as strength, toughness, and wear resistance are determined by the microstructures. TMT has been used with steels and with aluminum, titanium, and nickel alloys.

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By using TMT, the Soviets can optimize the properties of an alloy for a particular use. TMT also will allow the Soviets to extend the applicability of existing materials. There are several TMT processes that vary both in the mechanical deformation temperature and in the heat treatments used. One of the processes, called preliminary TMT (PTMT), can be done with equipment currently available in many plants. PTMT reportedly has increased the ultimate strength of aluminum alloys up to 40 percent. A major advantage of TMT is that no major retraining of the Soviet workforce is

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necessary because heat treatment and mechanical deformation are standard techniques. The lack of a skilled workforce has hampered the Soviet development and use of new materials, such as powdered metals and composites.

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